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(71) Applicant: **KIMBERLY-CLARK WORLDWIDE, INC.** [US/US]; 401 North Lake Street, Neenah, WI 54956 (US).

(72) Inventors: **HSU, Jay, C.**; 615 Portico Point, Alpharetta, GA 30022 (US). **SHICK, Richard, L.**; 340 South Vinyard Way, Alpharetta, GA 30004 (US). **WRIGHT, Audra, S.**; 4142 Country Manor Court, Woodstock, GA 30188 (US). **PUCKETT, Nancy, J.**; 750 Lake Charles Way, Roswell, GA 30075 (US).

(74) Agent: **DORITY & MANNING, P.A.**; One Liberty Square, 55 Beattie Place, Suite 1600, P.O. Box 1449, Greenville, SC 29602 (US).

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(54) Title: **OIL-BASED LOTIONS FOR PAPER PRODUCTS**

(57) Abstract: A paper product that is applied with a lotion composition is provided. In one embodiment of the present invention, the lotion composition includes an oil component that may contain oils and oil-soluble skin conditioning agents, a solid component that may contain fatty alcohols and waxes, a water-soluble skin conditioning component, and an emulsifier. Typically, the add-on level of the lotion composition is between about 1% to about 10% by weight of the paper product. As a result, the paper product can be used to dry the hands of a user, while also imparting certain benefits to the skin as well.

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## OIL-BASED LOTIONS FOR PAPER PRODUCTS

### Background of the Invention

Absorbent paper products, such as hand towels are commonly used to absorb fluids applied to the skin of a user during hand washing. The paper products are designed to absorb fluids from the skin and leave the skin dry. However, the soap ingredients often used to cleanse a person's hands or skin can remove oils, lipids, and natural skin conditioners and moisturizers from the stratum corneum of the person, leaving the skin excessively dry and subject to various skin problems, such as erythema, scales, flakes, and fissures. In addition, many people commonly wash their hands in environments susceptible to various diseases caused by the spread or growth of microbes, such as bacteria and viruses.

As such, a need currently exists for a paper product that contains a formulation that can readily transfer to the user's skin to inhibit excessive dryness and other skin-related problems.

### Summary of the Invention

The present invention is directed to a paper product that can dry and condition the skin of a user. In accordance with one embodiment of the present invention, a lotion composition is applied to the paper product that contains a variety of components. Typically, the add-on level of the lotion composition is between about 1% to about 10% by weight of the paper product. The lotion composition can generally contain a variety of components. For instance, the lotion composition contains an oil component in an amount up to about 70% by weight of the lotion composition. The oil component can include a variety of different ingredients, such as oils, oil-soluble skin-conditioning agents, etc. For example, in some embodiments, petrolatum can be used as an oil. Moreover, if desired, caprylic/capric triglyceride may be utilized as an oil-soluble skin conditioning agent.

In addition, the lotion composition also includes a solid component (i.e., a solid at or below about 25°C) in an amount up to

about 60% by weight of the lotion composition. The solid component can include a number of different ingredients. For instance, in some embodiments, the solid component can include one or more fatty alcohols, such as cetyl alcohol, stearyl alcohol, cetearyl alcohol, arachidyl alcohol, behenyl alcohol, or combinations thereof. Moreover, the solid component may also include one or more waxes, such as natural waxes, petroleum waxes, silicone waxes, synthetic waxes, or combinations thereof.

Besides the above-mentioned components, the lotion also includes an optional water-soluble skin conditioning component in an amount up to about 80% by weight of the lotion composition. In some embodiments, for example, the water-soluble skin conditioning component can include a humectant, such as glycerin. If desired, an optional emulsifier component can also be utilized in conjunction with the water-soluble skin conditioning component in an amount up to about 35% by weight of the lotion. In some embodiments, the emulsifier component can include one or more emulsifiers that have an HLB number less than about 5. One example of such an emulsifier is glyceryl stearate.

In accordance with another embodiment of the present invention, a process for producing a paper product for drying and conditioning the skin of a user is disclosed. The process includes forming a fibrous web, through-drying the web to remove water therefrom, and thereafter treating the dried web with a lotion composition such that the lotion has an add-on level of between about 1% to about 10% by weight of said paper product. For example, in some embodiments, the lotion composition can be printed onto the paper web. In other embodiments, the lotion composition can also be sprayed onto the paper web.

It should be noted that any given range presented herein is intended to include any and all lesser included ranges. For example, a range of from 45-90 would also include 50-90; 45-80; 46-89 and the

like. Thus, the range of 95% to 99.999% also includes, for example, the ranges of 96% to 99.1%, 96.3% to 99.7%, and 99.91 to 99.999%.

Other features and aspects of the present invention are discussed in greater detail below.

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### **Detailed Description of Representative Embodiments**

Reference now will be made in detail to various embodiments of the invention, one or more examples of which are set forth below.

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Each example is provided by way of explanation of the invention, not limitation of the invention. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. For instance, features illustrated or described as part of one embodiment, can be used on another embodiment to yield a still further embodiment. Thus, it is intended that the present invention cover such modifications and variations as come within the scope of the appended claims and their equivalents.

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In general, the present invention is directed to a paper product that contains a lotion useful for treating a person's skin. In particular, the lotion contains an oil component and a solid component, an optional water-soluble skin conditioning component, an optional emulsifier component, and other various ingredients, such as other skin-conditioning agents, anti-microbial agents, etc. It has been discovered that the particular selection and amount of ingredients utilized in the lotion of the present invention can provide a synergistic effect when applied to a paper product. Moreover, it has also been discovered that the lotion of the present invention can be applied at relatively low add-on levels to a paper product such that the resulting paper product can remain absorbent. As a result, the paper product of the present invention can dry a person's skin after washing, while simultaneously imparting certain benefits to the skin, such as inhibiting microbial growth, skin disease, skin dryness, etc.

Paper products made in accordance with the present invention

can include various types of products, such as towels, wipes, napkins, facial and bath tissue, and the like. The paper product can generally be produced from paper webs having one or multiple layers.

Moreover, depending on the desired characteristics, the paper product can contain one or multiple plies where each ply can contain one or more layers. The basis weight of the paper products can vary dependent on the particular application. In some embodiments, for example, the paper product can have a basis weight from about 1 to about 50 pounds per 2,880 square feet (i.e., ream), and in some embodiments, between about 5 to about 45 pounds per square ream. For instance, paper towels can sometimes be formed to have a basis weight of from about 10 to about 45 pounds per ream, and in some embodiments, between about 20 to about 30 pounds per ream.

As stated above, the paper product of the present invention is applied with a lotion that contains a variety of components. For example, the lotion contains an oil component that contains one or more oils and/or oil-soluble ingredients, such as oil-soluble skin conditioning agents, etc. The amount of the oil component in the composition can generally vary. For example, in some embodiments, the amount of the oil component can be up to 70% by weight of the composition, in some embodiments between about 20% to about 60% by weight of the composition, and in some embodiments, between about 30% about 50% by weight of the composition.

Some oils that can be used in the present invention include, but are not limited to, petroleum or mineral oils, such as petrolatum; animal oils, such as mink oil and lanolin oil; plant oils, such as soy sterol, sunflower oil, and avocado oil; and silicone oils, such as alkyl methyl silicones. For instance, in one embodiment, the use of petrolatum, sunflower seed oil, and/or soy sterol as oils has been determined to be particularly effective in the present invention. Moreover, the amount of oil utilized can be up to 70% by weight of the composition, and in some embodiments between about 10% to about 60% by weight of the

composition.

Moreover, as stated above, oil-soluble skin conditioning agents, can also be utilized in some embodiments. A skin conditioning agent generally refers to any material that can enhance certain properties of the skin, such as by moisturizing the skin, softening the skin, protecting the skin, and the like. For example, skin conditioning agents can further moisturize a person's skin to inhibit excessive dryness and various related skin diseases. The amount of the oil-soluble skin conditioning agents utilized can be up to 15% by weight of the composition, and in some embodiments between about 1% to about 10% by weight of the composition.

Some suitable oil-soluble skin conditioning agents that can be used include, but are not limited to, capric acid, caproic acid, caprylic acid, caprylic/capric mixed acids, caprylic/capric triglyceride (e.g., Crodamol GTCC sold by Croda, Inc.), cholesterol, lauric acid, magnesium stearate, myristic acid, oleic acid, palmitic acid, pentaerythritol, sorbitol, stearic acid, stearyl (vegetable), methyl gluceth 20 benzoate, linear primary alkyl esters of benzoic acid, such as C<sub>12</sub>-C<sub>15</sub> alkyl benzoate (e.g., Finsolv® TN sold by Finetex, Inc.), ethoxylated cetyl stearyl alcohol, Finsolv® SLB 101 or SLB 201 (sold by Finitex Corp.), etc. For instance, one particularly effective oil-soluble skin conditioning agent has been determined to be caprylic/capric triglyceride.

The use of an oil component, such as described above, can provide a number of benefits to the lotion composition formed therefrom. For instance, the ingredients of the oil component can act as moisturizing agents when applied to the skin of a user. In particular, the ingredients of the oil component can, in some cases, enhance the ability of a user's skin to retain water even after using the paper product. By retaining water, a user's skin will be less prone to becoming excessively dry, as well as being inhibited from developing certain skin problems, such as erythema. Moreover, the ingredients of

the oil component can also help to maintain the soft, smooth, and pliable appearance of the skin by remaining on the skin surface or in the stratum corneum to act as a lubricant, to reduce flaking, and to improve the skin's appearance.

5 In addition to an oil component, the lotion of the present invention can also contain a variety of other materials. For example, as stated above, the lotion of the present invention also typically contains a solid component that includes one or more ingredients that are a solid at or below about 25°C. For instance, some solid  
10 ingredients that can be utilized in the present invention include, but are not limited to, fatty alcohols, waxes, and the like. In general, the amount of the solid component can vary depending on the amount of the oil component utilized. For instance, in some embodiments, the amount of the solid component in the composition can be up to about  
15 60% by weight of the composition, in some embodiments between about 10% to about 50% by weight of the composition, and in some embodiments, between about 15% to about 40% by weight of the composition.

For example, some suitable fatty alcohols that can be used in  
20 the solid component include, but are not limited to, alcohols having a carbon chain length of C<sub>14</sub> - C<sub>30</sub>, including, for example, cetyl alcohol, stearyl alcohol, cetearyl alcohol (which is a mixture of cetyl alcohol and stearyl alcohols), arachidyl alcohol, and behenyl alcohol. Other suitable fatty alcohols are described in U.S. Patent Nos. 5,830,487 to  
25 Klofta, et al. and 5,871,763 to Luu, et al., which are incorporated herein in their entirety by reference thereto for all purposes. The fatty alcohol ingredients can generally be present in various amounts, such as up to about 50% by weight of the composition, in some embodiments between about 5% to about 40% by weight of the composition, and in  
30 some embodiments, between about 10% to about 30% by weight of the composition.

In addition, as noted above, the solid component can also

include a variety of wax ingredients. For instance, some suitable waxes include, but are not limited to, natural waxes, such as beeswax and carnauba wax; petroleum waxes, such as paraffin and ceresine wax; silicone waxes, such as alkyl methyl siloxanes; or synthetic waxes, such as synthetic beeswax and synthetic sperm wax. The wax ingredients can generally be present within the composition in various amounts. For example, the wax ingredients may be present in an amount up to about 20% by weight of the composition, in some embodiments, between about 1% to about 15% by weight of the composition, and in some embodiments, between about 5% to about 10% by weight of the composition.

The solid component of the lotion can, in some embodiments, inhibit the ingredients of the oil component from substantially migrating into the interior of the paper when deposited onto the surface of the paper product. Thus, compared to paper products treated with some types of liquid formulations, a greater percentage of the resulting lotion of the present invention is retained on the surface of the paper product where it can contact and transfer to the user's skin to provide various benefits. Moreover, in certain instances, the ingredients of the solid component can also impart a soothing feel to the skin of a user. Additionally, a lower add-on level can be used to deliver the same benefits at a lower cost because of the efficient placement of the composition substantially at the surface of the product.

For example, the inventors of the present invention have discovered that the combination of fatty alcohols and waxes may be particularly useful for helping retain the lotion on the surface of the paper product such that it can be more readily transferred to the skin of a user. For instance, in one embodiment, cetyl alcohol and/or stearyl alcohol can be utilized in conjunction with one or more waxes, such as ceresin wax. For example, in this embodiment, the cetyl alcohol can be present in an amount up to about 30% by weight of the lotion, and particularly between about 5% to about 15% by weight of the lotion,



while the stearyl alcohol can be present in an amount up to about 20% by weight of the lotion, and particularly, between about 5% to about 15% by weight of the lotion. Moreover, the wax ingredient(s) can be present, in this embodiment, in an amount between about 5% to about 10% by weight of the composition.

Besides the above-mentioned components, a lotion of the present invention can also include an optional water-soluble skin conditioning component that contains one or more water-soluble skin conditioning agents. The term "water-soluble" refers to a compound that has a hydrophilic-lipophilic balance (HLB) number of 7 or greater. The HLB index is well known in the art and is a scale that measures the balance between the hydrophilic and lipophilic solution tendencies of a compound. The HLB scale ranges from 1 to approximately 100, with the lower numbers representing highly lipophilic tendencies and the higher numbers representing highly hydrophilic tendencies.

In some embodiments, the amount of the water-soluble skin conditioning component can be up to about 80% by weight of the lotion composition, in some embodiments up to about 60% by weight of the composition, and in some embodiments, between about 10% to about 40% by weight of the composition.

For example, in one embodiment, the water-soluble skin conditioning component can include a humectant (i.e., a compound that has an affinity for water). A humectant can generally provide a number of benefits to a lotion of the present invention. For example, as stated above, a lotion applied to a paper product can be transferred to a person's hand after use. Because the lotion contains a humectant, which has an affinity for water, it can further enhance the retention of moisture on the person's skin and inhibit transepidermal water loss. The amount of humectant utilized in the lotion composition can vary. For example, in some embodiments, the amount of humectant can be up to about 35% by weight of the lotion composition, in some embodiments up to about 20% by weight of the composition,

and in some embodiments, between about 5% to about 20% by weight of the composition.

Some examples of suitable water-soluble humectants that can be used in the present invention include, but are not limited to, glycerin; ethoxylated glycerins, such as POE-26 glycerin, POE-7 glycerin, sorbitol, 1,2,6-hexanetriol sorbitol, and hydroxypropyl sorbitol; phosphinic carboxylic acid (PCA) and salts thereof, such as sodium PCA; alpha hydroxy acids and salts thereof, such as lactic acid, sodium lactate, and glycolic acid; glucose derivatives, such as glucose glutamate; polyalkylene glycols and alkylene polyols and their derivatives, including propylene glycol, dipropylene glycol, polypropylene glycol, polyethylene glycol, 1,3-butylene glycol, triethylene glycol, and dipropylene glycol; and other water-soluble humectants, such as maltodextrin, maltitol, mannitol, zylitol, sodium polyaspartate, ethoxylated castor oil, various humectants available from Lipo Chemicals (e.g., acetamide MEA, ethoxylated glycerin, lactamide MEA, etc.), and the like. For instance, the inventors of the present invention have discovered that glycerin may be particularly useful in moisturizing the skin of a user and protecting it from excessive drying and other problems with the skin. For example, in some embodiments, glycerin can utilized in an amount up to about 35% by weight of the lotion composition, in some embodiments up to about 20% by weight of the composition, and in some embodiments, between about 10% to about 20% by weight of the composition.

Moreover, besides the skin conditioning agents mentioned above, other skin conditioning agents can also be utilized in the lotion composition. For instance, some skin conditioning agents that may be suitable for use in the present invention include, but are not limited to, dimethicone, phospholipid SV (i.e., stearamidopropyl PG-dimonium chloride phosphate and cetyl alcohol), etc. Still other suitable skin conditioning agents are described in U.S. Patent No. 4,559,157 to Smith et al., 4,690,821 to Smith et al., 5,830,487 to Klofta, et al., and

5,871,763 to Luu, et al., which are incorporated herein in their entirety by reference thereto for all purposes. It should also be understood that any of the ingredients mentioned above or below (e.g., oils, fatty alcohols, emulsifiers etc.) and/or other ingredients can also act as skin conditioning agents as well.

Besides the above-mentioned components, the lotion composition can also include an optional emulsifier component that contains one or more emulsifiers. Although not required in all instances, an emulsifier can help stabilize certain ingredients within the lotion. When utilized, the emulsifier component can generally be present in an amount up to about 35% by weight of the composition, in some embodiments between about 1% to about 30% by weight of the composition, and in some embodiments, between about 5% to about 25% by weight of the composition.

Some suitable emulsifiers that can be used in the present invention include, but are not limited to, alkylene oxide esters of fatty acids, alkylene oxide diesters of fatty acids, alkylene oxide ethers of fatty acids, etc. Some examples of such emulsifiers include, but are not limited to, ceteth-2, ceteth-6, ceteth-10, ceteth-12, cetareth-6, cetareth-10, cetareth-12, cetareth-20, steareth-2, steareth-6, steareth-10, steareth-12, steareth-12, steareth-20, steareth-21, PEG-6 stearate, PEG-10 stearate, PEG-100 stearate, PEG-12 stearate, PEG-10 glyceryl stearate, PEG-20 glyceryl stearate, PEG-80 glyceryl tallowate, PEG-200 glyceryl tallowate, PEG-30 glyceryl cocoate, PEG-80 glyceryl cocoate, PEG-8 dilaurate, PEG-10 distearate, glycol stearate, propylene glycol stearate, glycol distearate, glyceryl laurate, glyceryl oleate, and mixtures thereof.

Still other suitable emulsifiers can include laureth-4, polyethylene glycol 20 sorbitan monolaurate (Polysorbate 20), polyethylene glycol 5 soya sterol, PPG-2 methyl glucose ether distearate, Polysorbate 80, cetyl phosphate, potassium cetyl phosphate, diethanolamine cetyl phosphate, Polysorbate 60,

polyoxyethylene 20 sorbitan trioleate (Polysorbate 85), sorbitan monolaurate, sorbitan tristearate, sorbitan stearate, sucrose distearate, sorbitan oleate, polyoxyethylene 4 lauryl ether sodium stearate, polyglyceryl-4 isostearate, and mixtures thereof. Besides the emulsifiers mentioned above, still other types of emulsifiers can also be utilized. For instance, other suitable emulsifiers that can be utilized in accordance with the present invention are described in U.S. Patent No. 6,001,377 to SaNogueira, Jr., et al., which is incorporated herein in its entirety by reference thereto for all purposes.

In one embodiment, it has been discovered that emulsifier(s) having a relatively low HLB number, such as less than about 5, can be used to stabilize one or more ingredients of the water-soluble skin conditioning component. Moreover, emulsifiers having a relatively low HLB number can also enhance the ability of the lotion to absorb water during use to enhance the absorption characteristics of a paper product of the present invention. For instance, some examples of suitable emulsifiers that have a relatively low HLB number include, but are not limited to, glyceryl stearate, sucrose distearate, steareth-2, sorbitan stearate, glycol stearate, glycol distearate, propylene glycol stearate, ceteth-2, sorbitan tristearate, glyceryl laurate, glyceryl oleate, etc.

When utilized, emulsifier(s) having a relatively low HLB number can be present in various amounts, such as up to about 35% by weight of the composition, in some embodiments between about 1% to about 30% by weight of the composition, and in some embodiments, between about 5% to about 25% by weight of the composition. For example, the present inventors have discovered that glyceryl stearate may be particularly useful as a relatively low HLB number emulsifier to stabilize water-soluble ingredient(s), such as glycerin. In fact, it has also been discovered that glyceryl stearate can help moisturize the skin of a user. For instance, in one embodiment, glyceryl stearate can be utilized in an amount between about 10% to about 25% by weight of

the composition.

Besides emulsifiers having a relatively low HLB number, it should also be understood that emulsifiers having a relatively high HLB number, such as above about 5, can be used to stabilize certain water-soluble and/or water-insoluble ingredients contained within the lotion of the present invention.

As stated above, various other ingredients may also be utilized in the lotion composition of the present invention. For instance, in some embodiments, an antimicrobial agent (i.e., an additive that is capable of inhibiting the growth of viruses, bacteria, fungi, and other microbes) can be incorporated into the lotion composition to disinfect a user's skin and/or to inhibit the further spread of certain microbes. Typically, an antimicrobial agent utilized in the present invention is biocompatible. The antimicrobial agent can be soluble in the oil components or can reside in the oil as a suspension. For example, some suitable antimicrobial agents that can be used in the present invention include, but are not limited to, chlorohexidine gluconate; parachlorometaxylenol (PCMX); benzylthoneium chloride; chitosan, such as chitosan pyrrolidone carboxylate; 2,4,4'-trichloro-2'-hydroxydiphenyl ether (triclosan), etc. Other suitable antimicrobial agents are described in U.S. Patent Nos. 5,871,763 to Luu, et al., 5,334,388 to Hoang, et al., and 5,686,089 to Mitra, et al., which are incorporated herein in their entirety by reference thereto for all purposes.

The amount of an antimicrobial agent(s) utilized in the lotion composition of the present invention can generally vary. For example, in some embodiments, the amount of the antimicrobial agent(s) can be up to about 20% by weight of the composition, in some embodiments up to about 10% by weight of the composition, and in some embodiments, between about 0.01% to about 5% by weight of the composition.

Furthermore, in some embodiments, the lotion can also contain

one or more preservatives. The preservative(s) can inhibit the growth of certain microbes on the paper product before and/or after use. Moreover, when the lotion composition is transferred to the skin of a user, the preservative(s) can further inhibit the growth of microbes thereon. The amount of the preservative(s) utilized in the lotion composition of the present invention can generally vary. For example, in some embodiments, the amount of the preservative(s) can be up to about 5% by weight of the composition, in some embodiments up to about 3% by weight of the composition, and in some embodiments, between about 0.1% to about 2% by weight of the composition.

Some suitable preservatives that can be used in the present invention include, but are not limited to, Mackstat H 66 (available from McIntyre Group, Chicago, IL), DMDM hydantoin (e.g., Glydant Plus™, Lonza, Inc., Fair Lawn, NJ), iodopropynyl butylcarbonate, Kathon (Rohm and Hass, Philadelphia, PA), methylparaben, propylparaben, 2-bromo-2-nitropropane-1,3-diol, benzoic acid, amidazolidinyl urea, diazolidinyl urea, and the like. Moreover, in one particular embodiment, a preservative obtained under the name "Phenonip" from NIPA Hardwick can be utilized. Other suitable preservatives includes those sold by Sutton Labs, such as "Germall 115" (amidazolidinyl urea), "Germall II" (diazolidinyl urea), and "Germall Plus" (diazolidinyl urea and iodopropynyl butylcarbonate).

In order to better enhance the benefits to consumers, other ingredients can also be used. For instance, some classes of ingredients that can be used include, but are not limited to: antiacne actives (a drug product used to reduce the number of acne blemishes, acne pimples, blackheads, and whiteheads); antifoaming agents (reduce the tendency of foaming during processing); antiseptic actives; antioxidants (product integrity); astringents--cosmetic (induce a tightening or tingling sensation on skin); astringents--drug (a drug product which checks oozing, discharge, or bleeding when applied to skin or mucous membrane and works by coagulating protein);

biological additives (enhance the performance or consumer appeal of the product); colorants (impart color to the product); deodorants (reduce or eliminate unpleasant odor and protect against the formation of malodor on body surfaces); external analgesics (a topically applied drug that has a topical analgesic, anesthetic, or antipruritic effect by depressing cutaneous sensory receptors, or that has a topical counterirritant effect by stimulating cutaneous sensory receptors); film formers (to hold active ingredients on the skin by producing a continuous film on skin upon drying); fragrances (consumer appeal); opacifiers (reduce the clarity or transparent appearance of the product); skin exfoliating agents (ingredients that increase the rate of skin cell turnover such as alpha hydroxy acids and beta hydroxyacids); skin protectants (a drug product which protects injured or exposed skin or mucous membrane surface from harmful or annoying stimuli); sunscreens (ingredients that absorb at least 85 percent of the light in the UV range at wavelengths from 290 to 320 nanometers, but transmit UV light at wavelengths longer than 320 nanometers); and surfactants (as cleansing agents, emulsifying agents, solubilizing agents, and/or suspending agents). For instance, in one embodiment, Aloe Vera powder can be utilized in an amount between about 0.0005% to about 0.005% by weight of the lotion composition.

Although various ingredients have been separately described herein, it should be understood that one ingredient may completely or partially accomplish the function of more than ingredient. For example, an oil utilized in the lotion of the present invention may also act as a skin conditioning agent.

In addition, in some embodiments, the lotion composition of the present invention is also anhydrous, i.e., generally free of water. By minimizing the amount of water, the resulting composition can sometimes be more easily retained on the surface of the paper product for transfer to the skin of a user. Moreover, in some instances, the utilization of lower amounts of water can inhibit the growth of various

types of microbes. However, it should be understood that minor amounts of water may be present in the composition. In some embodiments, for example, the lotion composition contains water in an amount less than about 5% by weight of the paper product, in some  
5       embodiments less than about 1% by weight of the paper product, and in some embodiments, less than about 0.5% by weight of the paper product.

Once formed, the lotion composition described above can then be applied to the paper product. The paper product may be formed  
10       from any papermaking process known in the art. For example, a papermaking process of the present invention can utilize creping, embossing, wet-pressing, double creping, calendering, as well as other known steps in forming the paper web. One particular embodiment of the present invention utilizes a non-compressive drying technique,  
15       such as uncreped through-drying, to form the paper product. In some instances, an uncreped through-dried paper product may have good absorbency and wet-resiliency characteristics. Some examples of uncreped through-drying techniques are disclosed in U.S. Patent Nos. 5,048,589 to Cook, et al.; 5,399,412 to Sudall, et al.; 5,510,001 to  
20       Hermans, et al.; 5,591,309 to Rugowski, et al.; and 6,017,417 to Wendt, et al., which are incorporated herein in their entirety by reference thereto for all purposes.

For example, uncreped through-drying generally involves the steps of: (1) forming a furnish of cellulosic fibers, water, and optionally,  
25       other additives, such as debonders and wet-strength agents; (2) depositing the furnish on a traveling foraminous belt, thereby forming a fibrous web on top of the traveling foraminous belt; (3) subjecting the fibrous web to through-drying to remove the water from the fibrous web; and (4) removing the dried fibrous web from the traveling  
30       foraminous belt.

In some embodiments, once dried, the lotion composition described above can then be applied. In general, the lotion



composition of the present invention can be applied to the paper product using a variety of methods. For instance, in one embodiment, the composition can be applied to the surface of the paper product using rotogravure printing, either direct or indirect (offset). Rotogravure printing can sometimes offer better control of the distribution and transfer rate of the composition onto the paper product. In addition, other application methods, such as flexographic printing, spraying (e.g., WEKO), hot melt adhesive spraying (e.g., Nordson), blade, saturant, coating, droplet throw, and foam applications, can be used.

Further, the lotion composition can be applied to one or both outer surfaces of the product after the product has been dried. When utilizing a multi-ply paper product, the lotion composition can be applied after the plies are brought together or prior to bringing the plies together. The individual plies can be layered or blended (homogeneous), creped or uncreped, through-dried or wet-pressed. In one embodiment, for example, the paper product is an uncreped through-dried paper product.

Other methods of applying the lotion to a paper product can also be utilized. For example, some ingredients of the lotion can be first entrapped within a porous delivery vehicle before being applied to the paper product such that the ingredients can be controllably released during drying and after the lotion is transferred to a user's skin. For instance, some delivery vehicles that can be used include, but are not limited to, microsponges, microcapsules, cyclodextrins and their derivatives, liposomes, polymeric sponges, and spray-dried starch. For instance, in some embodiments, the lotion composition may contain microcapsules in an amount of up to about 25% by weight of the lotion, in some embodiments up to about 10% by weight of the lotion, and in some embodiments, between about 0.2% to about 5% by weight of the lotion.

For instance, some examples of "microsponges" are described in U.S. Pat. No. 4,690,825 to Won, which is incorporated herein in its

entirety by reference thereto for all purposes. Another delivery vehicle that may be useful is a sponge-like material, such as POLY-PORE® L200. Moreover, one example of a microcapsule that may be suitable for use in the present invention is POLY-PORE® E200 (Chemdal Corp., Arlington Heights, IL), which is a delivery agent having soft, hollow spheres that can contain an additive at over 10 times the weight of the delivery vehicle.

The add-on level of the lotion can generally vary depending on the desired effect of the composition on the product attributes and the specific composition. As used herein, the term "add-on level" refers to the weight of a paper product treated with the lotion composition subtracted by the weight of the paper product prior to treatment, wherein this calculated weight is divided by the weight of the treated paper product and then multiplied by 100. For example, the add-on level of the composition can be from about 1 to about 10 weight percent, in some embodiments from about 1 to about 6 weight percent, in some embodiments, from about 1 to about 5 weight percent, and in some embodiments, from about 1 to about 3 weight percent, based on the weight of the paper product.

The present invention may be better understood with reference to the following examples.

#### **EXAMPLE 1**

The ability to form lotions for use on a paper product in accordance with the present invention was demonstrated. In particular, three lotions labeled A, B, and C were formed having the following characteristics:

**Table 1: Components of the Lotion Compositions**

| Ingredient             | A (wt.% of lotion) | B (wt.% of lotion) | C (wt. % of lotion) |
|------------------------|--------------------|--------------------|---------------------|
| Petrolatum             | 28.80              | 26.00              | 18.25               |
| Mineral Oil            | 0.00               | 0.00               | 18.25               |
| Sunflower Seed Oil     | 19.20              | 23.00              | 0.00                |
| Soy Sterol             | 1.00               | 1.00               | 0.00                |
| Glyceryl Stearate      | 15.40              | 12.00              | 0.00                |
| Cetearyl Alcohol       | 16.40              | 17.00              | 36.50               |
| Ceresin Wax            | 7.60               | 0.00               | 0.00                |
| Multiwax W-445         | 0.00               | 7.00               | 0.00                |
| Polysorbate-60         | 2.80               | 0.00               | 0.00                |
| Laureth-4              | 0.00               | 0.00               | 3.00                |
| Sorbitan Oleate        | 2.00               | 7.00               | 0.00                |
| Glycerin               | 4.80               | 5.00               | 10.00               |
| Phospholipid SV        | 0.00               | 0.00               | 6.00                |
| Coco caprylate/caprate | 0.00               | 0.00               | 8.00                |
| Glyceryl Oleate        | 2.00               | 2.00               | 0.00                |

The lotion compositions were prepared by mixing all of the components at a temperature of about 75°C until melted.

#### **EXAMPLE 2**

The ability of a paper product to condition the skin of a user during drying was demonstrated. A lotion was first formed having the following composition:

**Table 2: Components of the Lotion Composition**

| Component                    | Weight % of the Composition |
|------------------------------|-----------------------------|
| Petrolatum                   | 50                          |
| Cetyl Alcohol                | 10                          |
| Stearyl Alcohol              | 10                          |
| Caprylic/Capric Triglyceride | 10                          |
| Glyceryl Stearate            | 20                          |

The lotion composition was prepared by mixing all of the components at a temperature of about 75°C until melted. Thereafter, the resulting lotion was manually applied with a hand operated printing roll to an uncreped through-dried hand towel that was formed in a manner such as described above such that the add-on level was 6% by weight of the hand towel. The towel was formed from recycled fibers in an amount of 50% by weight of the web and from Pictou northern softwood fibers in an amount of 50% by weight of the web. The Pictou fibers were refined for 8 minutes using conventional refining techniques. The furnishes were then supplied to a machine chest and blended. A Kymene® 557H wet strength agent from Hercules, Inc. was also added to the machine chest in an amount of 20 pounds per ton. Further, a Witco C-6001 imidazoline-based softener was applied to the machine chest thereafter in an amount of 1.5 pounds per ton. The fibrous furnish was then formed into a paper web and dried using a through-air dryer. The resulting hand towel had a basis weight of 25 pounds per ream.

After forming the hand towel, the properties of the treated hand towel were compared to an untreated hand towel using the following procedure. Initially, 14 nurses washed their hands four times with IVORY® Bar Soap and dried them with the untreated towel that was folded. During each wash, the hands of the nurses were thoroughly washed and lathered for 15 seconds.

Thereafter, the subjects then washed their hands four additional

times and dried them with the treated hand towel of the present invention. The number of towels used after the first and fourth washes was recorded. After a five minute waiting period, the nurses washed their hands four additional times. Finally, the nurses were asked to compare the overall hand feel and drying ability of each towel.

Table 3 reflects the percent of those tested who only used the corresponding number of towels to dry their hands after the first and fourth washes for the untreated sample.

**Table 3: Towel Usage (untreated sample)**

| Number of Towels Used | (%) First Wash | (%) Fourth Wash |
|-----------------------|----------------|-----------------|
| 1                     | 0.0            | 0.0             |
| 2                     | 71.0           | 71.0            |
| 3                     | 21.0           | 29.0            |
| 4                     | 7.0            | 0.0             |

Table 4 reflects the percent of those tested who only used the corresponding number of towels to dry their hands after the first and fourth washes for the treated sample.

**Table 4: Towel Usage (treated sample)**

| Number of Towels Used | (%) First Wash | (%) Fourth Wash |
|-----------------------|----------------|-----------------|
| 1                     | 14.0           | 7.0             |
| 2                     | 64.0           | 64.0            |
| 3                     | 7.0            | 29.0            |
| 4                     | 14.0           | 0.0             |

As illustrated from the Tables 3 and 4, the addition of the lotion composition onto a hand towel did not substantially affect the ability of the towel to dry a person's hands. For example, the percentage of the subjects that needed four towels to dry their hands for the first wash only increased from 7.0% to 14.0%.

In addition, various other attributes of the hands of the subjects

after using the samples are also given below in Table 5.

**Table 5: Hand Attributes**

| Attribute              | % Who Preferred Untreated Towel | % Who Preferred Treated Towel | % Who Perceived No Difference in Samples |
|------------------------|---------------------------------|-------------------------------|--|
| Lotionized             | 14.0                            | 79.0                          | 7.0                                      |
| Softness               | 14.0                            | 79.0                          | 7.0                                      |
| Smoothness             | 14.0                            | 79.0                          | 7.0                                      |
| Silkeness              | 14.0                            | 79.0                          | 7.0                                      |
| Moisturization         | 14.0                            | 79.0                          | 7.0                                      |
| Overall Hand Condition | 14.0                            | 79.0                          | 7.0                                      |

As indicated above, the hand towel of the present invention can impart a number of beneficial affects to the user of a skin when used.

Moreover, the ability of the lotion to affect the moisture and skin barrier properties of skin was also tested. In particular, nine subjects were first acclimated in a controlled room set at 70°F and 50% relative humidity for 20 minutes. Upon acclimation, each subject had four 63 cm<sup>2</sup> test sites outlined on their volar forearm using a standard template. A series of baseline measurements were then taken from each test site with a Skicon-200 Conductance Meter (measurement of skin hydration) and a DermaLab® Systems Instrument (measurement of skin barrier damage). With the Skicon Meter, five conductance readings were taken for each 63 cm<sup>2</sup> test site and averaged. With the DermaLab® Instrument, four readings per second were taken at each test site and averaged.

The test sites were then washed with Ivory® Bar soap and dried with the appropriate hand towel (untreated and treated with the lotion of Table 2). To wash, the technician wet the site for 10 seconds, lathered for 30 seconds with Ivory® soap using a circular motion with

the first two fingers, rinsed for 15 seconds or more if necessary until site was completely free of soap. For wiping, each towel was folded into quarters and then folded into eighths. The test site was wiped using a downward motion with one side of the vertically held towel turned over to wipe with other side. The technician started at the top of each site with hands adjacent to each other to make a downswing motion to assure that as much of the towel contacted the test site as possible. The site was wet with water (for 5 seconds) and the towel then turned to the next  $\frac{1}{4}$  area. Drying steps were repeated 3 more times, as described above, to ensure that the entire towel was used.

This procedure was repeated every fifteen minutes, four times per day, for four consecutive days. One hour after the final wash, measurements were taken using the Skicon-200 Conductance Meter and the DermaLab® Systems Instrument. A total of 4 untreated towels and 4 treated towels was used each day. On the fifth day, only baseline readings were taken. The Skicon results are shown below in Table 6 and the DermaLab® results are shown in Table 7.

The data shown in Tables 6 and 7 represents the average percent change from the Day 1 base line, before washing each day (referred to as "b") and after the final wash of a day (referred to as "a"), over the five-day time period for the untreated and treated towels. A decrease in SkiCon values from the baseline represents a decrease in skin hydration properties, while an increase in DermaLab® values from the baseline represents an increase in skin barrier damage.

**Table 6: Skicon Results (Skin Hydration Properties)**

|                 | Day 1 | Day 2<br>(b) | Day 2<br>(a) | Day 3<br>(b) | Day 3<br>(a) | Day 4<br>(b) | Day 4<br>(a) | Day 5<br>(b) |
|-----------------|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Untreated Towel | -18%  | -6%          | -10%         | +14%         | +5%          | -15%         | -21%         | -21%         |
| Treated Towel   | +11%  | +6%          | 0%           | +4%          | +7%          | -7%          | -26%         | 0%           |

As shown in Table 6, the towel treated according to the present invention exhibited improved moisture conductance compared to the

untreated towel. For instance, after five days, the untreated towel had 21% less moisture conductance than the initial baseline moisture conductance, while the treated towel remained the same.

**Table 7: DermLab® Results (Skin Barrier Damage Properties)**

|                    | Day 1 | Day 2<br>(b) | Day 2<br>(a) | Day 3<br>(b) | Day 3<br>(a) | Day 4<br>(b) | Day 4<br>(a) | Day 5<br>(b) |
|--------------------|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Untreated<br>Towel | 62%   | 62%          | 202%         | 228%         | 401%         | 323%         | 414%         | 314%         |
| Treated<br>Towel   | 32%   | 35%          | 105%         | 141%         | 167%         | 141%         | 195%         | 211%         |

As shown in Table 7, the towel treated according to the present invention exhibited improved skin barrier properties compared to the untreated towel. For instance, after five days, the untreated towel had a 314% increase in skin barrier damage from the initial baseline reading, while the treated towel had an increase of only 211%.

### **EXAMPLE 3**

The ability of a paper product to condition the skin of a user during drying was demonstrated. A lotion was first formed having the following composition:

**Table 8: Components of the Lotion Composition**

| Component                    | Weight % of the Composition |
|------------------------------|-----------------------------|
| Petrolatum                   | 40                          |
| Cetyl Alcohol                | 5                           |
| Stearyl Alcohol              | 10                          |
| Caprylic/Capric Triglyceride | 5                           |
| Glyceryl Stearate            | 20                          |
| Dimethicone                  | 15                          |
| Microsponges*                | 5                           |

\*The microsponges encapsulated 75% of the dimethicone.

The lotion composition was prepared by mixing all of the components at a temperature of about 75°C until melted. Thereafter,



the resulting lotion was manually applied with a hand operated printing roll to an uncreped through-dried hand towel that was formed in a manner such as described above such that the add-on level was 6% by weight of the hand towel. The towel was formed as described in Example 2.

After forming the hand towel, the properties of the hand towel of the present invention were compared to an untreated hand towel using the following procedure. Initially, 14 nurses washed their hands four times with IVORY® Bar Soap and dried them with the untreated towel that was folded. During each wash, the hands of the nurses were thoroughly washed and lathered for 15 seconds.

Thereafter, the subjects then washed their hands four additional times and dried them with the hand towel of the present invention. The number of towels used after the first and fourth washes was recorded. After a five minute waiting period, the nurses washed their hands four additional times. Finally, the nurses were asked to compare the overall hand feel and drying ability of each towel.

Table 9 reflects the percent of those tested who only used the corresponding number of towels to dry their hands after the first and fourth washes for the untreated sample.

**Table 9: Towel Usage (untreated sample)**

| Number of Towels Used | (%) First Wash | (%) Fourth Wash |
|-----------------------|----------------|-----------------|
| 1                     | 0.0            | 0.0             |
| 2                     | 79.0           | 79.0            |
| 3                     | 21.0           | 21.0            |
| 4                     | 0.0            | 0.0             |

Table 10 reflects the percent of those tested who only used the corresponding number of towels to dry their hands after the first and fourth washes for the treated sample.

**Table 10: Towel Usage (treated sample)**

| Number of Towels Used | (%) First Wash | (%) Fourth Wash |
|-----------------------|----------------|-----------------|
| 1                     | 7.0            | 35.0            |
| 2                     | 72.0           | 48.0            |
| 3                     | 21.0           | 14.0            |
| 4                     | 0.0            | 3.0             |

As illustrated from the Tables 9 and 10, the addition of the lotion composition onto a hand towel did not substantially affect the ability of the towel to dry a person's hands. For example, the percentage of the subjects that needed four towels to dry their hands for the fourth wash only increased from 0.0% to 3.0%.

In addition, various other attributes of the hands of the subjects after using the samples are also given below in Table 11.

**Table 11: Hand Attributes**

| Attribute              | % Who Preferred Untreated Towel | % Who Preferred Treated Towel | % Who Perceived No Difference in Samples |
|------------------------|---------------------------------|-------------------------------|--|
| Lotionized             | 7.0                             | 79.0                          | 14.0                                     |
| Softness               | 21.0                            | 71.0                          | 7.0                                      |
| Smoothness             | 29.0                            | 71.0                          | 0.0                                      |
| Silkiness              | 21.0                            | 64.0                          | 14.0                                     |
| Moisturization         | 21.0                            | 71.0                          | 7.0                                      |
| Overall Hand Condition | 29.0                            | 71.0                          | 0.0                                      |

As indicated above, the hand towel of the present invention can impart a number of beneficial affects to the user of a skin when used.

Moreover, the ability of the lotion to affect the moisture conductance of skin was also tested. In particular, an untreated towel

and treated towel were tested for moisture conductance in the manner set forth in Example 2. The Skicon and DermLab® results are shown below in Tables 12 and 13. The data shown in Tables 12 and 13 represents the average percent change from the Day 1 base line, before washing each day (referred to as "b") and after the final wash of a day (referred to as "a"), over the five-day time period for the untreated and treated towels. A decrease in SkiCon values from the baseline represents a decrease in skin hydration properties, while an increase in DermaLab® values from the baseline represents an increase in skin barrier damage.

**Table 12: Skicon Results (Skin Hydration Properties)**

|                    | Day 1 | Day 2<br>(b) | Day 2<br>(a) | Day 3<br>(b) | Day 3<br>(a) | Day 4<br>(b) | Day 4<br>(a) | Day 5<br>(b) |
|--------------------|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Untreated<br>Towel | -18%  | -6%          | -10%         | +14%         | +5%          | -15%         | -21%         | -21%         |
| Treated<br>Towel   | +6%   | +5%          | -2%          | +10%         | +1%          | -3%          | -20%         | -3%          |

As shown in Table 12, the towel treated according to the present invention exhibited improved moisture conductance compared to the untreated towel. For instance, after five days, the untreated towel had 21% less moisture conductance than the initial baseline moisture conductance, while the treated towel had only 3% less moisture conductance than the initial baseline moisture conductance.

**Table 13: DermLab® Results (Skin Barrier Damage Properties)**

|                    | Day 1 | Day 2<br>(b) | Day 2<br>(a) | Day 3<br>(b) | Day 3<br>(a) | Day 4<br>(b) | Day 4<br>(a) | Day 5<br>(b) |
|--------------------|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Untreated<br>Towel | 62%   | 62%          | 202%         | 228%         | 401%         | 323%         | 414%         | 314%         |
| Treated<br>Towel   | 21%   | 27%          | 64%          | 130%         | 163%         | 144%         | 217%         | 183%         |

As shown in Table 13, the towel treated according to the present invention exhibited improved skin barrier properties compared to the untreated towel. For instance, after five days, the untreated towel had

a 314% increase in skin barrier damage from the initial baseline reading, while the treated towel had an increase of only 183%.

Thus, as indicted from the representative examples above, a paper product of the present invention can provide numerous benefits to a user. Specifically, it has been discovered that the particular selection and amount of ingredients utilized in the lotion of the present invention can provide a synergistic effect when applied to a paper product. For instance, the lotion applied to the paper product can help moisturize the skin of a user during use, as well as remaining on a user's hands for continued moisturizing affects. In some cases, the lotion can enhance the ability of a user's skin to retain water even after using the paper product. By retaining water, a user's skin can be prevented from becoming excessively dry, as well as being inhibited from developing certain skin problems, such as erythema. Moreover, the lotion can help to maintain the soft, smooth, and pliable appearance of the skin by its ability to remain on the skin surface or in the stratum corneum to act as a lubricant, to reduce flaking, and to improve the skin's appearance. In some instances, the lotion can even help disinfect the skin of a user to inhibit the growth and/or spreading of various microbes.

In addition, as a result of the lower lotion add-on level that is obtainable in accordance with the present invention, a paper product formed therewith can also retain the ability to dry a person's skin. Thus, for example, a person can initially wash his/her hands using conventional soap. Thereafter, the person can utilize a paper product of the present invention for drying the wetted skin.

While the invention has been described in detail with respect to the specific embodiments thereof, it will be appreciated that those skilled in the art, upon attaining an understanding of the foregoing, may readily conceive of alterations to, variations of, and equivalents to these embodiments. Accordingly, the scope of the present invention should be assessed as that of the appended claims and any

equivalents thereto.

**WHAT IS CLAIMED IS:**

1. An absorbent paper product for drying and conditioning the skin of a user, said paper product comprising:

a paper web; and

5 a lotion composition applied to said paper web at an add-on level between about 1% to about 10% by weight of said paper product, said lotion composition comprising:

i) an oil component in an amount up to about 70% by weight of said lotion composition, said oil component comprising at least one oil and at least one oil-soluble skin conditioning agent;

10 ii) a solid component in an amount up to about 60% by weight of said lotion composition, said solid component comprising a material selected from the group consisting of fatty alcohols, waxes, and combinations thereof;

15 iii) optionally, a water-soluble skin conditioning component in an amount up to about 80% by weight of said lotion composition; and

iv) optionally, an emulsifier component in an amount up to about 35% by weight of said lotion composition.

2. A paper product as defined in claim 1, wherein said oil component comprises between about 30% to about 50% by weight of said lotion composition.

3. A paper product as defined in claim 1, wherein said at least one oil is present in an amount between about 10% to about 60% by weight of said lotion composition.

25 4. A paper product as defined in claim 1, wherein said at least one oil includes petrolatum.

5. A paper product as defined in claim 1, wherein said at least one oil-soluble skin conditioning agent is present in an amount between about 1% to about 10% by weight of said lotion composition.

30 6. A paper product as defined in claim 1, wherein said at least one oil-soluble skin conditioning agent includes caprylic/capric triglyceride.

7. A paper product as defined in claim 1, wherein said solid component comprises between about 15% to about 40% by weight of said lotion composition.

5 8. A paper product as defined in claim 1, wherein said solid component comprises at least one fatty alcohol in an amount between about 10% to about 30% by weight of said lotion composition.

9. A paper product as defined in claim 1, wherein said fatty alcohols include cetyl alcohol, stearyl alcohol, cetearyl alcohol, arachidyl alcohol, behenyl alcohol, or combinations thereof.

10 10. A paper product as defined in claim 1, wherein said solid component comprises at least one wax in an amount between about 5% to about 10% by weight of said lotion composition.

11. A paper product as defined in claim 1, wherein said wax includes natural waxes, petroleum waxes, silicone waxes, synthetic  
15 waxes, or combinations thereof.

12. A paper product as defined in claim 1, wherein said water-soluble skin conditioning component comprises between about 10% to about 40% by weight of said lotion composition.

13. A paper product as defined in claim 1, wherein said skin  
20 conditioning component includes a humectant.

14. A paper product as defined in claim 13, wherein said humectant includes glycerin.

15. A paper product as defined in claim 1, wherein said emulsifier component comprises between about 5% to about 25% by  
25 weight of said lotion composition.

16. A paper product as defined in claim 1, wherein said emulsifier component includes at least one emulsifier having an HLB number below about 5.

17. A paper product as defined in claim 16, wherein said at  
30 least one emulsifier comprises between about 5% to about 25% by weight of said lotion composition.

18. A paper product as defined in claim 16, wherein said at

least one emulsifier includes glyceryl stearate.

19. A paper product as defined in claim 1, wherein said add-on level of said lotion is between about 1% to about 6% by weight of said paper product.

5 20. A paper product as defined in claim 1, wherein said add-on level of said lotion is between about 1% to about 3% by weight of said paper product.

21. A paper product as defined in claim 1, wherein said lotion composition further comprises an antimicrobial agent.

10 22. A paper product as defined in claim 1, wherein said paper product has a basis weight between about 1 to about 50 pounds per ream.

23. A paper product as defined in claim 1, wherein said paper product is a towel having a basis weight between about 10 to about 45  
15 pounds per ream.

24. An absorbent paper towel for drying and conditioning the skin of a user, said towel having a basis weight from about 10 to about 45 pounds per ream, said towel comprising:

a paper web;

20 a lotion composition applied to said paper web such that the add-on level of said lotion is between about 1% to about 10% by weight of said paper towel, said lotion composition being generally free of water and comprising the following components:

25 i) an oil component in an amount up to about 70% by weight of said lotion composition, said oil component including at least one oil in an amount between about 10% to about 60% by weight of said lotion composition and at least one oil-soluble skin conditioning agent in an amount between about 1% to about 10% by weight of said lotion composition;

30 ii) a solid component in an amount up to about 60% by weight of said lotion composition, said solid component comprising at least one fatty alcohol and optionally a wax, said fatty alcohol comprising



between about 10% to about 30% by weight of said lotion composition;  
and

iii) a water-soluble skin conditioning component in an amount up  
to about 80% by weight of said lotion composition, said water-soluble  
skin conditioning component including at least one humectant; and

iv) an emulsifier component in an amount up to about 35% by  
weight of said lotion composition, said emulsifier component including  
at least one emulsifier having an HLB number less than about 5, said  
at least one emulsifier comprising between about 5% to about 25% by  
weight of said lotion composition.

25. A paper product as defined in claim 24, wherein said at  
least  
one oil includes petrolatum.

26. A paper product as defined in claim 24, wherein said at  
least  
one oil-soluble skin conditioning agent includes caprylic/capric  
triglyceride.

27. A paper product as defined in claim 24, wherein said at  
least one fatty alcohol includes cetyl alcohol, stearyl alcohol, cetearyl  
alcohol, arachidyl alcohol, behenyl alcohol, or combinations thereof.

28. A paper product as defined in claim 24, wherein said wax  
includes natural waxes, petroleum waxes, silicone waxes, synthetic  
waxes, or combinations thereof.

29. A paper product as defined in claim 24, wherein said at  
least one humectant includes glycerin.

30. A paper product as defined in claim 24, wherein said at  
least one emulsifier includes glyceryl stearate.

31. A paper product as defined in claim 24, wherein said add-  
on level of said lotion is between about 1% to about 6% by weight of  
said paper product.

32. A paper product as defined in claim 24, wherein said add-  
on level of said lotion is between about 1% to about 3% by weight of

said paper product.

33. A paper product as defined in claim 24, wherein said lotion composition further comprises an antimicrobial agent.

34. A method for forming a paper product for drying and conditioning the skin of a user, said method comprising:

forming a web from at least one furnish containing fibers and water;

through-drying said web to remove water therefrom; and

thereafter, treating said dried web with a lotion composition such that said lotion has an add-on level of between about 1% to about 10% by weight of said paper product, said lotion composition comprising:

i) an oil component in an amount up to about 70% by weight of said lotion composition, said oil component at least one oil and at least one oil-soluble skin conditioning agent;

ii) a solid component in an amount up to about 60% by weight of said lotion composition, said solid component comprising a material selected from the group consisting of fatty alcohols, waxes, and combinations thereof;

iii) optionally, a water-soluble skin conditioning component in an amount up to about 80% by weight of said lotion composition; and

iv) optionally, an emulsifier component in an amount up to about 35% by weight of said lotion composition.

35. A method as defined in claim 34, wherein said lotion composition is printed onto said paper web.

36. A method as defined in claim 34, wherein said lotion composition is sprayed onto said paper web.

37. A method as defined in claim 34, wherein said at least one oil is present in an amount between about 10% to about 60% by weight of said lotion composition.

38. A method as defined in claim 34, wherein said at least one oil-soluble skin conditioning agent is present in an amount between about 1% to about 10% by weight of said lotion composition.

39. A method as defined in claim 34, wherein said solid component comprises at least one fatty alcohol in an amount between about 10% to about 30% by weight of said lotion composition.

40. A method as defined in claim 34, wherein said solid component comprises at least one wax in an amount between about 5% to about 10% by weight of said lotion composition.

41. A method as defined in claim 34, wherein said water-soluble skin conditioning component comprises between about 10% to about 40% by weight of said lotion composition.

42. A method as defined in claim 34, wherein said emulsifier component includes at least one emulsifier having an HLB number below about 5.

43. A method as defined in claim 42, wherein said at least one emulsifier comprises between about 5% to about 25% by weight of said lotion composition.

44. A method as defined in claim 34, wherein said add-on level of said lotion is between about 1% to about 6% by weight of said paper product.

45. A method as defined in claim 34, wherein said add-on level of said lotion is between about 1% to about 3% by weight of said paper product.

46. A method as defined in claim 34, wherein said lotion composition further comprises an antimicrobial agent.

47. A method as defined in claim 34, wherein said paper product is a towel having a basis weight between about 10 to about 45 pounds per ream.



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(71) Applicant: **KIMBERLY-CLARK WORLDWIDE, INC.** [US/US]; 401 North Lake Street, Neenah, WI 54956 (US).

(72) Inventors: **HSU, Jay, C.**; 615 Portico Point, Alpharetta, GA 30022 (US). **SHICK, Richard, L.**; 340 South Vinyard Way, Alpharetta, GA 30004 (US). **WRIGHT, Audra, S.**; 4142 Country Manor Court, Woodstock, GA 30188 (US). **PUCKETT, Nancy, J.**; 750 Lake Charles Way, Roswell, GA 30075 (US).

(74) Agent: **DORITY & MANNING, P.A.**; One Liberty Square, 55 Beattie Place, Suite 1600, P.O. Box 1449, Greenville, SC 29602 (US).

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(54) Title: **OIL-BASED LOTIONS FOR PAPER PRODUCTS**

(57) Abstract: A paper product that is applied with a lotion composition is provided. In one embodiment of the present invention, the lotion composition includes an oil component that may contain oils and oil-soluble skin conditioning agents, a solid component that may contain fatty alcohols and waxes, a water-soluble skin conditioning component, and an emulsifier. Typically, the add-on level of the lotion composition is between about 1% to about 10% by weight of the paper product. As a result, the paper product can be used to dry the hands of a user, while also imparting certain benefits to the skin as well.

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## INTERNATIONAL SEARCH REPORT

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## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61K7/48 A61K7/50

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

CHEM ABS Data, EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
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Patent family members are listed in annex.

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European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
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Authorized officer

Glikman, J-F

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